

ADJUSTABLE HOUSING FOR A HAND TOOL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a housing, and more particularly to an adjustable housing for a pneumatic or an electrical hand tool that can be adjusted between two positions easily and conveniently.

2. Description of Related Art

A pneumatic or an electrical hand tool has a housing to enclose an internal mechanism in the housing for a user to conveniently hold the housing to operate the hand tool. The traditional housing for a hand tool in accordance with the prior art substantially comprises two half casings combined with each other to define a chamber for receiving the internal mechanism. The housing is formed as a head portion with an operation portion and a handle portion to be gripped by a user. A rotating shaft of the internal mechanism extending out from the head portion is connected to a tool head such as a screwdriver head, so that the user can hold the hand tool to tighten or release a fastener.

However, because the head portion and the handle portion of the traditional housing are integrally combined together and cannot be adjusted at an angle, the use of a hand tool with a traditional housing is not versatile. Therefore, a housing with an adjusting device is provided to adjust the housing at two different positions for versatile use. To keep the housing at a locked condition, a positioning device is mounted in the adjusting device to keep the housing from unintentionally moving to another position while the handle tool is in operation. A button is mounted in the positioning device for releasing the locked condition

1 of the positioning device when the user wants to change the position of the
2 housing. Therefore the button must be pushed before the housing is adjusted, the
3 use of the conventional housing with an adjusting device is inconvenient.

4 To overcome the shortcomings, the present invention tends to provide a
5 housing with an adjusting device to mitigate or obviate the aforementioned
6 problems.

7 SUMMARY OF THE INVENTION

8 The main objective of the invention is to provide a housing for a handle
9 tool and that can be adjusted between two positions easily and conveniently. The
10 housing has a head, a handle and two positioning devices. The head is composed
11 of two half casings combined with each other, and each half casing has a first
12 adjusting base and a recess with an inner surface defined in the first adjusting
13 base. The handle is pivotally attached to the head and is composed of two half
14 casings combined with each other. Each half casing of the handle has a second
15 adjusting base and a recess. Each second adjusting base corresponds to the first
16 adjusting base on a corresponding one of the half casings of the head. The recess
17 is defined in the second adjusting base and aligns with the recess in the
18 corresponding first adjusting base. The positioning devices are respectively
19 mounted between the aligning recesses of the first and second adjusting bases on
20 the head and the handle. Each positioning device has a pressing disk, a pressed
21 disk and a biasing member. The pressing disk and the pressed disk are non-
22 rotatably received respectively in the aligned recesses of the first and second
23 adjusting bases and abut against each other. Each of the pressing and pressed
24 disks has a central hole, a guiding block and a positioning block. The guiding

1 block is formed on the disk and has two curved guiding edges selectively
2 abutting against one end of the positioning block on the abutting disk. The
3 biasing member abuts against one* of the pressing disk and the pressed disk and
4 provides a restituted force to the abutting disk to abut the pressing disk against
5 the pressed disk.

6 Other objects, advantages and novel features of the invention will
7 become more apparent from the following detailed description when taken in
8 conjunction with the accompanying drawings.

9 BRIEF DESCRIPTION OF THE DRAWINGS

10 Fig. 1 is a perspective view of a hand tool with a housing in accordance
11 with the present invention;

12 Fig. 2 is an exploded perspective view of the housing in accordance with
13 the present invention;

14 Fig. 3 is a top plan view in partial section of the hand tool with the
15 housing in Fig. 1;

16 Fig. 4 is an enlarged top plan view in partial section of the housing in Fig.
17 3;

18 Fig. 5 is an operational enlarged top plan view in partial section of the
19 housing in Fig. 4; and

20 Fig. 6 is an operational side plan view of the hand tool with the housing
21 in Fig. 1.

22 DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

23 With reference to Figs. 1 and 2, a housing for a pneumatic or an
24 electrical hand tool in accordance with the present invention comprises a head

1 (10), a handle (20), a pivot (14) and two positioning devices (30). The head (10)
2 has a proximal end (not numbered) and a distal end (not numbered) and is
3 composed of two half casings (11) combined with each other to define a chamber
4 (not numbered) in the head (10). Each half casing (11) has a first adjusting base
5 (12) and a recess (122). The first adjusting base (12) is formed on the half casing
6 (11) at the proximal end of the head (10). The recess (122) is defined in the first
7 adjusting base (12) and has an inner surface. In an optional embodiment, the
8 recess (122) is defined in the first adjusting base (12) at a side far away from the
9 other first adjusting base (12). In an alternative embodiment, the recess (122) is
10 defined in the first adjusting base (12) at a side facing the other first adjusting
11 base (12).

12 The handle (20) has a proximal end (not numbered) pivotally attached to
13 the proximal end of the head (10) and a distal end (not numbered) and is
14 composed of two half casings (21) combined with each other to define a chamber
15 (not numbered) in the handle (20). The hand tool has an internal mechanism (not
16 shown) mounted in the chambers in the head (10) and the handle (20). Each half
17 casing (21) of the handle (20) has a second adjusting base (22) and a recess (222).
18 The second adjusting bases (22) are formed on the half casings (21) at the
19 proximal end of the handle (20) and correspond respectively to the first adjusting
20 bases (12) on the half casings (11) of the head (10). The recess (222) is defined in
21 the second adjusting base (22), faces the recess (122) in the corresponding first
22 adjusting base (12) and has an inner surface. In an optional embodiment, the
23 recess (222) is defined in the second adjusting base (22) at a side facing the other
24 second adjusting base (22) when the recess (122) is defined in the first adjusting

1 base (12) at a side far away from the other first adjusting base (12). In an
2 alternative embodiment, the recess (222) is defined in the second adjusting base
3 (22) at a side away from the other second adjusting base (22) when the recess
4 (122) is defined in the first adjusting base (12) at a side facing the other first
5 adjusting base (12).

6 The pivot (14) extends through the adjusting bases (12,22) on the head
7 (10) and the handle (20) to pivotally connect the head (10) with the handle (20).

8 The positioning devices (30) are respectively mounted between the
9 facing recesses (122,222) in the first and second adjusting bases (12,22) on the
10 head (10) and the handle (20) to selectively keep the head (10) in one of two
11 different positions relative to the handle (20). With further reference to Figs. 3
12 and 4, each positioning device (30) comprising a pressing disk (32), a pressed
13 disk (34) and a biasing member (36). The pressing disk (32) is non-rotatably
14 received in the recess (22) in a corresponding one of the second adjusting bases
15 (22) on the handle (20). To keep the pressing disk (32) from rotation relative to
16 the corresponding second adjusting base (22), the recess (222) has multiple ribs
17 (224) formed on the inner surface, and the pressing disk (32) has multiple
18 notches (326) engaging respectively with the ribs (224) in the recess (222).

19 The pressing disk (32) has a central hole (not numbered), a guiding
20 block (322) and a positioning block (324). The central hole is defined through
21 the pressing disk (32) for the pivot (14) extending through the central hole. The
22 guiding block (322) is formed on the pressing disk (32) at a side far away from
23 the corresponding half casing (21) of the handle (20) and has two curved guiding
24 edges (323) formed respectively on two ends of the guiding block (322). The

1 positioning block (324) is formed on the pressing disk (32) at a side far away
2 from the corresponding half casing (21) of the handle (20) and has two ends.

3 The pressed disk (34) is non-rotatably received in the recess (122) of the
4 corresponding first adjusting base (12). To keep the pressed disk (34) from
5 rotation relative to the corresponding first adjusting base (12), the recess (122)
6 has multiple ribs (124) formed on the inner surface, and the pressed disk (34) has
7 multiple notches (346) engaging respectively with the ribs (124) in the recess
8 (122).

9 The pressed disk (34) has a central hole (not numbered), a guiding block
10 (342) and a positioning block (344). The central hole is defined through the
11 pressed disk (34) for the pivot (14) to extend through the central hole. The
12 guiding block (342) is formed on the pressed disk (34) at a side far away from the
13 corresponding half casing (11) of the head (10). The guiding block (342) on the
14 pressed disk (34) has two curved guiding edges (343) formed respectively on
15 two ends of the guiding block (34) and selectively abutting against one end of the
16 positioning block (324) on the corresponding pressing disk (32). The positioning
17 block (344) is formed on the pressed disk (34) at a side far away from the
18 corresponding half casing (11) of the head (10) and has two ends selectively
19 abutting against one of the guiding edges (323) of the guiding block (322) on the
20 corresponding pressing disk (32).

21 The biasing member (36) is mounted around the pivot (14) and abuts
22 against either the pressing disk (32) or the pressed disk (34) to provide a
23 restituted force to the abutting disk (32,34). In an optional embodiment, the
24 biasing member (36) of one of the positioning devices (30) is received in the

1 recess (122) in the corresponding first adjusting base (12) and abuts against the
2 pressed disk (34), and the biasing member (36) of the other positioning device
3 (30) is received in the recess (222) in the corresponding second adjusting base
4 (22) and abuts against the pressing disk (32). In an alternative embodiment, the
5 biasing members (36) of the positioning devices (30) are both received in the
6 recesses (122,222) in the first adjusting bases (12) or the second adjusting bases
7 (22) to abut against the pressed disks (34) or the pressing disks (32).

8 With the abutments between the guiding blocks (322,342) and the
9 positioning blocks (324,344) on the pressing disks (32) and the pressed disks
10 (34), the head (10) can be kept at a desired position relative to the handle (10),
11 for instance head (10) is straight along the handle (20) as shown in the solid lines
12 in Figs. 1 and 6. The head (10) can be kept from rotation relative to the handle
13 (20) during the operation of the hand tool.

14 When the user wants to change the angle between the head (10) and the
15 handle (20), a desired large force is applied to the head (10) to pivotally rotate
16 the head (10) relative to the handle (20). With the force applied to the head (10),
17 the pressed disks (34) of the positioning devices (30) received in the recesses
18 (122) in the first adjusting bases (12) will rotate with the first adjusting bases
19 (12). With the arrangements of the curved guiding edges (323,343) of the
20 guiding blocks (322,342) on the pressing disks (32) and the pressed disks (34),
21 the ends of the positioning blocks (324,344) on the pressing disks (32) and the
22 pressed disks (34) will move along the corresponding curved guiding edges
23 (323,343) on the guiding blocks (322,342). Consequently, the pressing disk (32)
24 or the pressed disk (34) will be pushed to move along the pivot (14) and away

1 from the corresponding pressed disk (34) or pressing disk (32) when the head (10)
2 is rotated. When the head (10) is rotated to another desired position, the
3 positioning blocks (324,344) will move over the corresponding guiding blocks
4 (322,342). One end of each positioning block (324,344) will abut against a
5 corresponding curved guiding edge (323,343) on the corresponding guiding
6 block (322,342) by means of the restituted forces provided by the biasing
7 members (36). Accordingly, the head (10) will be kept at the second position, for
8 example the second position shown in the phantom lines in Fig. 6. Because to
9 push a button is not necessary to adjust the housing between two desired
10 positions, to adjust the angle between the head (10) and the handle (20) of the
11 housing is easy and convenient.

12 Even though numerous characteristics and advantages of the present
13 invention have been set forth in the foregoing description, together with details
14 of the structure and function of the invention, the disclosure is illustrative only,
15 and changes may be made in detail, especially in matters of shape, size, and
16 arrangement of parts within the principles of the invention to the full extent
17 indicated by the broad general meaning of the terms in which the appended
18 claims are expressed.